Effect of Body Mass Index in Patients Administered Epidural Steroid Injection for Back Pain

Bel Ağrisi için Epidural Steroid Enjeksiyonu Uygulanan Hastalarda Beden Kitle Indeksinin Etkisi

Does Obesity Effect the Treatment of Back Pain?

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Özet

Amaç: Bel ağrısı nedeniyle medikal ve fizik tedavi uygulanmış fakat bel ağrısı şikayetleri devam eden obez ve obez olmayan hastalarda, epidural steroid enjeksiyonu (ESİ) uygulamasının etkinliğini araştırmayı amaçladık. Gereç ve Yöntem: En az 6 aydır devam eden bel ve bacak ağrısı şikayetleri nedeniyle Algoloji polikliniğine başvuran, tek seviyeli disk patolojisi saptanan ve epidural steroid enjeksiyonu planlanan 31-73 yaşları arasında 119 hasta çalışmaya dahil edildi. Hastalar obez (BKİ≥30kg/m2) ve obez olmayan (BKİ<30 kg/m2) olarak iki gruba ayrıldı. 48 hasta obez, 71 hasta obez olmayan olarak değerlendirildi. ESİ uygulamasından sonraki 1.ay, 6.ay ve 12.ay' da ağrı şiddetleri VAS ile değerlendirilirken, fonksiyonel durumları Oswestry skalası ile değerlendirildi. Bulgular: Tüm hastalarda 1.ESİ uygulamasından 30 gün, 6 ay ve 12 ay sonra ölçülen VAS ve Oswestry skoru değerlerinde tedavi öncesine göre istatistiksel olarak anlamlı iyileşme saptandı (p<0.001). Vas 1 ≥ 5 olan 56 hastaya ikinci enjeksiyon yapıldı. 2. enjeksiyon yapılan obez ve obez olmayan hasta grupları arasında istatiksel bir fark yoktu(p=0,597). 2. enjeksiyon yapılan hem obez, hem de obez olmayan hasta grubunda ağrı palyasyonunda ve fonksiyonel iyileşmede belirgin olarak başarı elde edilmişken, bu iki grup arasında istatiksel fark yoktu. Tartışma: Analjezik ve fizik tedavi yöntemleri uygulanmasına rağmen yeterince ağrı palyasyonu ve fonksiyonel iyileşme sağlanamayan tek seviye lomber diskopatili hastalarda, ESI uygulamasının obez ve obez olmayan hastalarda etkin bir tedavi yöntemi olduğunu düşünmekteyiz.

Anahtar Kelimeler

Bel Ağrısı; Epidural Steroid Enjeksiyon; Obezite; Oswestry Skalası

Abstract

Aim: The aim is to investigate the efficacy of epidural steroid injection applied for lumbar discopathy pain to obese and non-obese patients with continuing complaints of back pain, despite the application of medical treatment and physical therapy. Material and Method: The study included 119 patients aged 31-73 years who presented at the Algology Clinic with complaints of back and leg pain which had been ongoing for at least 6 months and with single level disc pathologies, and for whom epidural steroid injection was planned. The patients were separated into 2 groups as obese (BMI ≥ 30kg/m2) and non-obese (BMI<30kg/m2); 48 patients were evaluated as obese and 71 as non-obese. Pain palliation in obese and non-obese patient groups was compared using early stage and 1st year VAS scores and the functional status was evaluated with the Oswestry Scale. Results: In all patients there was found to be a statistically significant fall in the VAS and Oswestry values at 30 days, 6 months, and 12 months after the first ESI compared to the pre-treatment values (p<0.0001). A second injection was applied to 56 patients with VAS ≥ 5. There was no statistical difference between obese and non-obese patients who were administered a second injection (p=0.597). There was a significant palliation of pain and functional improvement in both obese and non-obese patient groups following the second injection, with no statistically significant difference between the groups. Discussion: In patients with single level lumbar discopathy, where sufficient palliation of pain and functional improvement has not been achieved despite the application of analgesia and physical therapy, the application of ESI can be considered an effective treatment method for both obese and non-obese patients.

Keywords

Back Pain; Epidural Steroid Injectıon; Obesity; Oswestry Scale

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Introduction

It has been determined that in the global population, 70%-80% of individuals experience back pain at some time in their lives; the prevalence in industrialised countries is 60%-80%. Annual prevalence for back pain varies from 15%-45% [1,2].

Overweight and obesity increase the risk of low back pain [3]. Several possible mechanisms explain this association: mechanical overloading on the vertebral column [4], systemic inflammation [5], and disc degeneration [6].

Whatever the cause of back pain, conservative treatment methods (bed rest, medical treatment, physical therapy) are applied first [1,2]. When the underlying reason is fully understood and no response has been obtained by other conservative methods, surgical treatment is the last alternative.

Recently, in addition to these methods, minimally invasive interventions have started to be used in the treatment of back pain. Percutaneous approaches which are minimally invasive include nerve blocks (epidural steroid injection[ESI], facet nerve blocks, trigger point injections, diagnostic nerve blocks), radiofrequency thermoregulation (facet denervation, partial rhizotomy, disc lesion), spinal cord stimulation, and spinal opioids [2].

In this study, the aim is to investigate the early stage and 1-year efficacy of epidural steroid injection applied for lumbar discopathy pain to obese and non-obese patients with continuing complaints of back pain, despite the application of medical treatment and physical therapy modalities.

Material and Method

Approval for the study was granted by the Local Ethics Committee and informed consent was obtained from all patients. The study included 119 (67 females, 52 males) patients aged 31-73 years who presented at the Algology Clinic with complaints of back and leg pain which had been ongoing for at least 6 months and for whom epidural steroid injection was planned. The patients were separated into 2 groups based on Body Mass Index (BMI =kg/m2) values as obese (BMI ≥ 30kg/m2) and non-obese (BMI<30kg/m2); 48 patients were evaluated as obese and 71 as non-obese. Pain palliation in the obese and non-obese patient groups was compared using early stage and 1st year Visual Analog Scale (VAS) scores. Pain palliation in the obese and non-obese patients was evaluated with VAS and the functional status was evaluated with the Oswestry Disability Index.

The 10cm horizontal visual analogue scale was explained to the patients. A score of 0 indicates no pain, 10 indicates the worst pain imaginable and 5, pain of moderate severity. The patients completed the scale to define the severity of their pain. Patients with VAS values of >5 were included in the study. The VAS values were labelled as VAS 0 before the procedure, VAS 1 at 1 month, VAS 2 at 6 months, and VAS 3 at 12 months.

The Oswestry Disability Index is a scale used to measure the performance of patients on necessary daily activities and to determine the individual's capabilities and limitations. In the clinical evaluation in this test, questions are asked in 10 sections related to pain severity, capacity for daily tasks, pain on standing up, walking, sitting, standing, sleeping, social life, travelling, and changes in pain. The patients were requested to select one of 6 options to best define their status. The results were evaluated as the effect on daily life at a minimal level (0-20 points), moderate (20-40 points), severe (40-60 points), completely restricted (60-80 points), or bedridden (80-100 points) [7]. The Turkish version of the Index has been tested for validity and reliability by Yakut et al. [8]. The Oswestry values were labelled as Oswestry 0 before the procedure, Oswestry 1 at 1 month, Oswestry 2 at 6 months, and Oswestry 3 at 12 months.

A detailed anamnesis was taken from all patients included in the study. Questions were asked regarding the form of the onset of pain, its character, frequency, extent, trigger factors, whether or not there was any history of trauma and any history of unexplained weight loss, fatigue, rash, fever, and any medication-dependent additional systemic or psychiatric diseases. In the physical examination of the patients, bilateral lower extremity sensory and motor examinations were made, then deep tendon reflexes were examined. Straight leg raises, the Kernig, and Lasegue tests were applied.

In the evaluation of pain severity, VAS was used. Patients with a VAS score of >5 were included in the study. Haemogram, prothrombin time (PT), and International Normalised Ratio (INR) values were examined. Anticoagulant medications of patients on an anticoagulant treatment regime for any reason were terminated at least 5 days before the procedure, following consultation with the Cardiovascular Surgery Clinic. Patients with normal haemogram, PT and INR values in blood samples repeated on the day of the procedure were included in the study.

Patients were excluded from the study if they had previously undergone lumbar disc operation, responded to medical and physical therapy, had a history of local or systemic glucocorticoid treatment within the last 6 months, multiple discopathy and an appearance of extruded and/or migrated disc on lumbar MRI, motor loss determined in one or both lower extremities in the physical examination, if the decision for surgery had been taken in consultation with the Brain and Neurosurgery Dept, those diagnosed with congestive cardiac failure or psychiatric disease, those with a known allergy to the medications to be used in the study, if they were pregnant, if an infection from any cause was determined prior to the treatment, if there were absolute contra-indications for the epidural intervention which was to be applied, and those who developed any complication during the procedure (vasovagal syncope, hypotensive attack).

Patients were taken to the procedure room and ECG, non-invasive systemic arterial pressure, pulse-oximetry, and oxygen saturation monitorisation was applied. A peripheral vascular route was opened. The necessary equipment and drugs were prepared for emergency intervention. After blood pressure measurements, the patient was placed in the sitting position.

Under aseptic-antiseptic conditions, skin infiltration anaesthesia was applied to the procedure area with 2mL 2% lidocaine (Aritmal, Osel). With a median approach to the epidural space between L3-4 or L4-5 vertebrae, an 18-gauge Tuohy needle was entered and by advancing from lumbar to caudal, the epidural space was identified with the 'pendant drop' method. Then, the epidural space was confirmed by applying the 'resistance loss' technique with a resistance loss injector filled with 0.9% NaCl solution.

After ensuring that no blood or CSF had entered the catheter, a 10mL prepared medication mixture of 80mg triamsinolon acetonoid (SinakortA 40 mg; 2 ampoules, G. E. Ulagay), 2mL

0.5%bupivacaine hydrochloride (Marcaine 20 mL flacon, AstraZeneca), and 6mL saline was injected at the appropriate rate into the epidural space. The Tuohy catheter was then removed, a dressing was applied to the procedure area, and the area was covered. Immediately after the procedure, the patients were placed into a supine position and were observed for 30 minutes. If any complication developed associated with the procedure (hypotension, bradycardia, syncope, entrance to the subarachnoid space) it was recorded and that patient was excluded from the study. Patients evaluated with normal haemodynamic parameters and neurological findings were evaluated again 4 hours after the procedure and were discharged.

The first ESI was applied 10 days later, when patients presented at follow up. At 10 days after the application, the patients were evaluated again with respect to complications. For 56 patients with a VAS score of ≥5, a second ESI was planned to be applied 4 weeks after the first injection.

In the evaluation of pain severity and functional status, all patients were evaluated with VAS and Oswestry Scale at 30 days, 6 months, and 12 months after the first ESI application.

Statistical Analysis

All statistical analyses of the data obtained in the study were made using SPSS v. 20.0 (Statistical Package for the Social Sciences, Microsoft Office Word 2013, USA) software program. The data were stated as mean±SD. The conformity to normal distribution of the data was analysed with the Kolmogorov Smirnov test. In the evaluation of the demographic data and obesity, The Mann Whitney U-test and chi-square test were used. In the evaluation of the VAS and Oswestry scores recorded during follow-up, the Friedman test was used. In the evaluation of the effect of obesity on the VAS and Oswestry scores, the Mann Whitney U-test was used. The results were evaluated at a 95% confidence interval. A value of $p<0.05$ was accepted as statistically significant.

Results

The demographic data of the 119 patients, age, gender, symptom duration, and the data relating to the lumbar disc herniation and the distributon of the discopathy levels are shown in Table 1.

Prior to ESI application, the mean VAS value of the entire patient group was determined as 7.03±0.764.

In all patients, there was found to be a statistically significant fall in the VAS and Oswestry values at 30 days, 6 months, and 12 months after the first ESI compared to the pre-treatment values ($p<0.0001$) (Table 2a).

A second injection was applied to 56 patients with VAS ≥ 5, comprising 32 (45%) of 71 non-obese patients and 24 (50%) of 48 obese patients. There was no statistical difference between obese and non-obese patient groups who were administered a second injection ($p=0.597$). There was a significant palliation of pain and functional improvement in both the obese and non-obese patient groups following the second injection, with no statistically significant difference between the groups (Table 2b) (Figure 1).

Table 1. Demographic data

	Non-Obese (BMI<30kg/m²)	Obese (BMI≥30kg/m²)	P
Gender			
Male	51 (76,1%)	16 (23,9%)	<0,001*
Female	20 (38,5%)	32 (61,5%)	
Age	49,70±11,48	53,75±10,35	0,097**
Symptom duration			
<12 months	43 (84,3%)	8 (15,6%)	<0,001*
≥12 months	28 (41,1%)	40 (58,9%)	
Discopathy Level			
L3- L4	4 (20%)	16 (80%)	
L4- L5	25 (55%)	20 (45%)	<0,001*
L5- S1	42 (77,8%)	12 (22,2%)	

L: Lumbar, S: sacral
*Chi-Square Test
**Mann-Whitney U Test

Table 2. VAS and Oswestry scale values after ESI (mean±SD) The relationship between the VAS and Oswestry Disabilty Index scores in obese and non-obese patients (mean±SD) (a)

VAS 0	VAS 1	VAS 2	VAS 3	P*
7,03 ± 0,764	4,60 ± 0,816	2,82 ± 0,646	2,68 ± 0,747	< 0,001
Oswestry 0	Oswestry 1	Oswestry 2	Oswestry 3	P*
42,57 ± 4,586	31,82 ± 4,682	22,87 ± 5,286	21,23 ± 5,149	<0,001

*Friedman Test

Table 2. The relationship between the VAS and Oswestry Disabilty Index scores in obese and non-obese patients (mean±SD) (b)

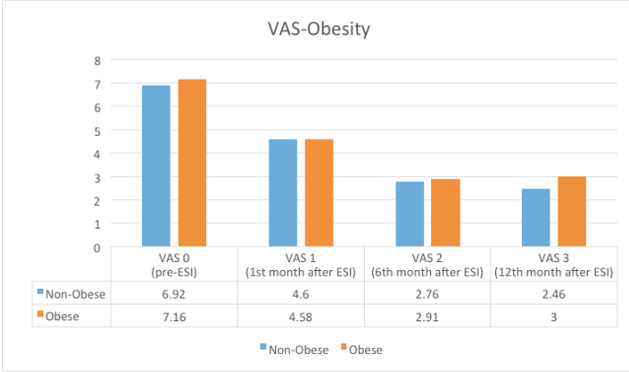
	Non Obese n=71)	Obese (n=48)	P**
VAS 0	6,92	7,16	0,100
VAS 1	4,6	4,58	0,925
VAS 2	2,76	2,91	0,120
VAS 3	2,46	3	0,130
Oswestry 0	41,57	43	0,100
Oswestry 1	31,59	32,16	0,911
Oswestry 2	21,34	24,25	0,083
Oswestry 3	20,81	21,83	0,256

**Mann-Whitney U test

Discussion

In this study, a significant palliation of pain and functional improvement was obtained as a result of the application of lumbar ESI in obese and non-obese patients. Limitations of the study could be that there was no control group, only single level disc pathologies were included, the follow-up period was short, and there were few evaluation criteria.

In patients presenting with back pain, it is essential to thoroughly understand the etiopathogenesis of back pain to make a correct diagnosis by excluding differential diagnoses. With increasing age, there can be degeneration in the disc region and disc degeneration in the facet joint region such as those triggered by disc hernias which can cause osteoarthritis, listhesis, and spinal stenosis. Sometimes the pathology starts in the facet joint and spreads to other vertebral areas. Thus, in the treatment of back and leg pain occurring with features of complex pathologies, unfortunately, in most cases, surgical treatment does not provide the anticipated pain palliation [9-11].



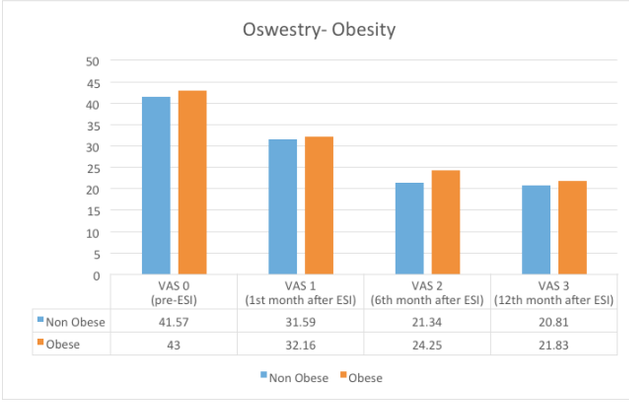


Figure 1. VAS values and Oswestry Disabilty Index values after ESI in obese and non obese patients

Another of the factors causing lumbar region pathology is obesity [3]. Both at the onset of back pain and in the response to treatment, obesity plays a significant role. By accelerating degeneration of the structures in the lumbar region, obesity reduces the response to treatment [6]. In another study including obese and non-obese patients, the application of transforaminal ESI achieved the same rate of successful results [12]. In the current study, both palliation of pain and functional improvement were successfully achieved during follow-up in both patient groups. In addition, the application of ESI to obese patients reduced pain at a similar level to that of non-obese patients and because there was functional improvement, the obese patients were better able to lose weight after the treatment. Thus a contribution was made to the dual effect of the treatment.

In the treatment of back pain, first medical treatments and physical therapy modalities must be attempted, then minimally invasive interventions (nerve blocks, epidural steroid injection [ESI], facet nerve blocks, trigger point injections, diagnostic nerve blocks), radiofrequency thermoregulation (facet denervation, partial rhizotomy, disc lesion), spinal cord stimulation, and spinal opioids should be selected [2,9-11].

Lumbar epidural injections can be applied as isolated local anaesthetics, local steroid applications, or combined local anaesthetic and steroid applications [13]. Although there are studies in the literature related to the efficacy of these applications, it has been reported that the combined application of local anaesthetic and steroids is superior to the application of isolated local anaesthetic [14]. In the current study, the combination of local anaesthetic and steroids was used. Pain palliation can be considered to be achieved in the short-term with local anaesthetics; in the long-term, there is both local and systemic anti-inflammatory effect with steroids.

Another study in the literature on the subject of steroid dose discussed the rate of side effects and that efficacy is related to doses between 40mg and 80mg. Although similar efficacy has been reported from the application of 40mg and 80mg steroids, it has been determined that fewer side effects are experienced by patients administered low-dose steroids [15]. In the current study, 80mg steroid was administered to all the patients. No side effects were encountered related to the applied steroid. 40mg steroid could be administered to patients with unstable blood sugar levels such as those with diabetes or those who develop diabetes-related complications.

Another controversial topic in literature related to the application of lumbar epidural steroid is single injection or repeated doses [16]. In patients to whom multiple doses have been administered, significant symptomatic relief and a reduced need for opioids have been determined [17]. In addition, the application of a single dose to patients aged below 50 years has been reported to be more successful than when applied to those aged over 50 years [18]. In the current study, more than one dose was administered to patients with a VAS score of ≥5 after the first dose. Although there is the potential benefit of the cumulative effect of the medication in repeated ESI applications, treatment should always be tailored to the individual patient.

Lumbar epidural steroid applications can be made with interlaminar, transforaminal, or caudal methods. Different results have been reported in the literature related to the efficacy of these methods [13,19-22]. It has been reported in studies that applications of lumbar epidural injection made under fluoroscopy or CT have achieved effective pain palliation using less medication and with reduced complication rates [23,24].

Wagner recommended injection under CT guidance, particularly for patients who had previously had unsuccessful lumbar epidural steroid injection administered blind or under fluoroscopy [25]. In the current study, no imaging device was used. As a C-arm scopy and radiolucent table are needed for fluoroscopy, and both the physician and patient are exposed to high levels of radiation in CT, the blind administration of interlaminar epidural steroid injection by an experienced specialist physician can be considered to minimise side effects and complications.

At the end of the current study, it was determined that patients had regained lower back movement and could comfortably perform daily activities as a result of lumbar ESI treatment. Patients with moderate and severe Oswestry scores at the beginning of the treatment attained lower Oswestry scores at the end of the 12-month follow-up period. This functional improvement of patients with initial moderate and severe Oswestry scores was thought to be due to there being no other pathology causing lower back pain other than the single level discopathy.

Conclusion

In patients with single level lumbar discopathy, where sufficient palliation of pain and functional improvement has not been achieved despite the application of analgesia and physical therapy, the application of ESI can be considered an effective treatment method for both obese and non-obese patients.

Competing interests

The authors declare that they have no competing interests.

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